



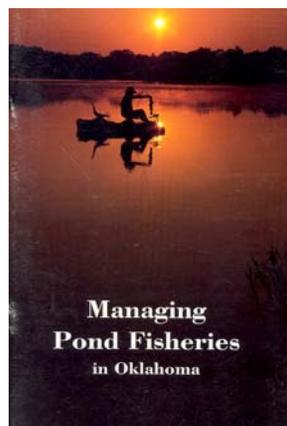
## PURPOSE

- To provide habitat for fish and other aquatic life.
- To develop and maintain a desired fish species composition and ratio.
- To develop and maintain a desired level of fish production and/or harvest.

A well managed pond can provide many recreational and utilitarian benefits to the landowner. Ponds go through an aging process and poor planning can greatly speed that process, shortening your pond's effective life. Good management starts with a plan that identifies what you want from your pond and how to manage the pond to realize your objectives.

Start by identifying what you would like your pond to provide. You may be planning to use it for recreational fishing. If so, what species of fish are you most interested in? You may also be interested in using the pond for swimming, livestock water supply, fire protection, a place to observe wildlife, etc.

A great source of information for the management of ponds in Oklahoma is *Managing Ponds Fisheries in Oklahoma* by the Oklahoma Department of Wildlife Conservation (ODWC). This publication is available through ODWC offices. This publication provides pond



management tips from construction to stocking, fishing, and maintenance.

## POND SPECIFICATIONS

Ponds that are constructed correctly, according to the following specifications, will be easiest to manage for good fishing opportunities. Contact your local NRCS office for additional recommendations when planning your pond and ask for a copy of the NRCS publication *Ponds – Planning, Design, and Construction*. Follow these specifications for success:

- Dedicate at least 1/2 acre of surface water. One acre or more of surface water will give better results.
- The watershed to pond ratio should not exceed 20:1 (20 acres of watershed for every surface acre of pond). A desirable ratio would be about 6:1 up to about 15:1. Ponds with watershed/area ratios less than 4:1 will experience extended low water conditions during dry seasons. Ponds with watershed ratios greater than 20:1 will experience excessive run-off bringing additional nutrients and sediment into the pond, reducing the pond's life span.
- Pond depth should range from 10 to 15 feet. This depth should apply to over one fourth of the pond area. Deep ponds reduce the likelihood of ponds going dry in summer or resulting in winter fish kills.
- Maintain a water depth of three feet around most of the shoreline (except for beach area). NRCS recommends grading side slopes at a 3:1 ratio - one foot vertical for every three foot horizontal, such that the 3 feet of depth will occur about 9 feet from the shoreline. Deeper water limits growth of emergent vegetation.
- Install a properly designed pipe outlet with a water control device and earthen emergency spillway to allow safe passage of storm water runoff and to manipulate water levels for management purposes.
- During new pond construction or repair, install fish structures such as brush piles, rocks, old tire bundles, or used sewer pipe to provide cover and spawning habitat.

## STOCKING

### Initial Stocking

New ponds must be initially stocked with fish species that do well in the size and type of pond they are placed,

and they must be stocked in the proper amounts. Improperly stocked ponds will never live up to their potential. It is imperative that fish are not brought in from another pond, lake or stream for stocking. *Managing Ponds Fisheries in Oklahoma* has stocking recommendations for fish species that do well in ponds and are popular with most pond owners. From the chart below you can calculate the number of fish necessary to stock your pond. Other options include stocking only species such as catfish or hybrid bluegill. If you would like to try other species of fish or have special sport fishing objectives, contact your local NRCS Field Office or ODWC Regional Fisheries Biologist for specific recommendations. Not all fish available through local sales are suitable for all ponds. The ODWC also has a fish stocking program for new or rehabilitated ponds. Despite popular misconceptions, pond owners who receive fish from ODWC maintain control of who fishes the pond. Make application through ODWC before June 1 for delivery of fish in the fall.

**ODWC Recommended Stocking for Recreational Fishing**

Species	Fingerlings Per Surface Acre	Stocked In:
Bluegill	500	Fall
Catfish	100	Fall
Bass	100	Following Spring

Supplemental Stocking

Some species like channel catfish do not normally maintain a population in a pond by natural reproduction. Therefore, periodic supplemental stocking of fish 8-inches or larger must be made as the fish initially stocked are harvested.

**OPERATION AND MAINTENANCE**

Watershed Management

Managing ponds for good fishing requires good management of the watershed. The pond's watershed is the land area from which water drains to the pond. Good watershed management benefits water quality in the pond and reduces problems with muddy water, low dissolved oxygen, algae and aquatic plants. Use of the following practices throughout the pond's watershed will benefit your pond:

- Adding a buffer of perennial grasses around the pond where surface water flows into the pond during a storm is essential. A properly designed and maintained filter strip will filter muddy water and other pollutants out of the water before it enters the pond. Filter strips should be at least 30 feet wide if the slope is relatively flat. The steeper the slope coming into the pond, the wider the filter strip should be. See NRCS Job Sheet 393 – Filter Strip, for specifications and recommendations.

- Divert runoff away from the pond that may come from barnyards, feedlots and other sources of contamination. This type of runoff often carries nutrients that can cause excessive vegetation growth in the pond. Oftentimes runoff can be diverted by constructing an earthen diversion on a gentle grade around the pond, much like a terrace.
- When using pesticides within the watershed, follow label directions and never apply just prior to a storm event. Doing so could allow chemical runoff to enter the pond.
- If at all possible, fence all livestock out of the pond. If the pond is also used for a livestock water supply, install a freeze-proof watering tank downstream of the pond. The watering tank can be supplied by a pipeline through the dam if the watershed is sufficient for both livestock and the pond.
- Implement a conservation plan that addresses all forms of soil erosion on all cropland within the watershed. If you do not already have a plan, contact your NRCS District Conservationist for assistance.

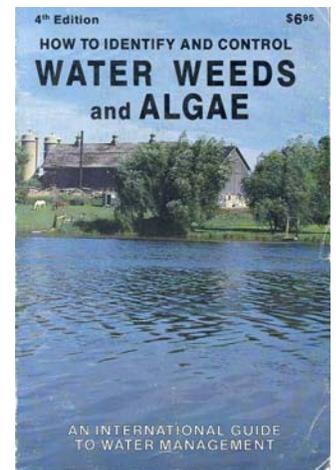
Aquatic Plant Control

Aquatic plants play a valuable role in improving water quality, providing cover, and diversifying the food web in ponds. When aquatic vegetation takes up more than 20% of the water surface area, control may be needed. Control can be obtained by mechanical, herbicide or biological methods. Control of aquatic plants does not remove nutrients. Excessive control of rooted aquatic plants, by any method, promotes algae blooms and increase the chance of a summer fish kill. Proper pond location and construction coupled with nutrient control will reduce aquatic plant problems.

Mechanical - Physical removal of plants can be accomplished by hand-pulling and raking. Mechanical removal can be effective in small ponds or spot treating areas such as swimming beaches. It is very labor intensive and not usually practical for larger areas.

Aquatic Herbicides - Prudent use of aquatic herbicides, approved for aquatic use, can be an effective technique for controlling aquatic plants in ponds. First, accurately identify aquatic plant(s) to be treated, select the appropriate herbicide, and read and follow label directions.

Recommended herbicides that control aquatic plants may be obtained from *OSU Extension Agents'*



*Handbook of Insect, Plant Disease and Weed Control* or other publications such as the one shown on in the picture at right.

Biological - Triploid grass carp can be stocked in man-made impoundments to control excessive aquatic vegetation. Aquatic plant control with triploid grass carp can take up to three years or more and may not control all species of plants such as filamentous algae.

### Fish Harvest

In order to maintain good fishing in a pond, the harvest must be managed in order to keep proper balance of predator and prey fish in the pond. People often harvest bass and leave bluegill sunfish. This upsets the predator-prey balance that keeps bass fed and sunfish from becoming over populated. The result is that often the bass disappear and the pond is filled with lots of small bluegill. To avoid this problem, a good recommendation is to keep only the larger bass (15 inches or greater), return the smaller ones that are caught and harvest 5 lbs. of bluegill and/or redear sunfish for every 1 lb. of bass harvested.

### Correcting Poor Fishing

Several years after initial stocking, fishing your pond may not provide the good fishing it once did. If desirable fish are still present but are undersized or few in number, the situation can be corrected by management and possibly supplemental stocking. First, an assessment of the current fish population must be made. The ODWC Publication *Managing Ponds Fisheries in Oklahoma* provides methods to assess your fish population and list possible management and stocking recommendations for each situation. You may also want to consult your ODWC Regional Fisheries Biologist for more specific recommendations.

If your pond has undesirable species of fish or a stunted fish population, then it maybe necessary to remove the existing fish population and start over again. There are two ways to remove existing fish: draining and chemical treatment. If the pond can be completely drained, the pond should be left to dry for several weeks before refilling with water. When using chemical treatment to remove fish, application of rotenone is the accepted procedure. For further instructions on purchasing and using rotenone, contact your ODWC Regional Fisheries Biologist or County Game Warden.

### Fertilization

Fertilization of fish ponds can increase production, but is only recommended when the pond will be intensively managed and monitored. Without proper management it can lead to several problems, such as algal blooms and excessive vegetation growth and fish kills related to low dissolved oxygen levels.

### Feeding Fish

Feeding is not necessary for fish pond management in Oklahoma where bass, bluegill and channel catfish are stocked. If you wish to feed your fish, commercially

prepared pelleted fish foods used for catfish production can also be fed to bluegill. Use floating pellets and be careful not to feed too much as over feeding can lead to problems. Fish food contains nutrients similar to fertilizers and therefore has the potential to promote excessive aquatic vegetation growth if over used. For more information on feeding fish, see the ODWC publication *Managing Ponds Fisheries in Oklahoma*.

### Fish Diseases

Bacteria and fungus are the most likely causes of fish disease in ponds and lakes. Bacteria and fungus are always present and cause problems only when the fish's resistance is low due to stress. Stress may come about due to injury, poor water quality, stunted populations, and during periods of spawning. There is little that can be done to treat the disease in the wild. If poor water quality or population imbalance is a problem, correcting the problem will reduce stress on the fish and result in a healthier fish population.

Most fish kills are natural due to low oxygen levels, but if there is a fish kill, consult with an ODWC Fisheries Biologist for possible causes and remedies.

### Other Problems

For other pond problems such as: poor water quality, muddy water (turbidity) fish kills, fish parasites, etc., see ODWC publication *Managing Ponds Fisheries in Oklahoma* or contact your ODWC Regional Fisheries Biologist.

## REFERENCES

- Oklahoma Department of Wildlife Conservation. 1995., *Managing Ponds Fisheries in Oklahoma*. Oklahoma City, Oklahoma. 41 pp.
- Oklahoma Department of Wildlife Conservation. *Fish for Your Farm Pond*. Oklahoma City, Oklahoma.
- Natural Resources Conservation Service. 1997. *Ponds – Planning, Design, Construction*. Agriculture Handbook Number 590.
- Applied Biochemists, Inc. *How to Identify and Control Water Weeds and Algae*. 5300 West County Line Road, Mequon, WI 53092.
- Oklahoma State University. Cooperative Extension Service. *Grass Carp for Pond Weed Management*. P.O. Box 1378, Ada, Ok 74820. Current Report 9202
- Oklahoma State University. Annual Publication. Cooperative Extension Service. *OSU Extension Agents' Handbook of Insect, Plant Disease and Weed Control*. Stillwater, Ok

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